



Foot-and-Mouth Disease



Overview





Vesicular Diseases

- Viral diseases manifested by lameness, vesicular lesions and, subsequently, erosions of the epithelium of the mouth, nares, muzzle, feet, and teats.
- Vesicular diseases are clinically indistinguishable from each other.



VESICULAR DISEASES



- Foot-and-Mouth Disease (FMD)
- Vesicular Stomatitis (VS)
- Swine Vesicular Disease (SVD)
- Vesicular Exanthema of Swine (VES)



Vesicular Diseases :

Etiology



| VIRUS | FAMILY | GENUS |
|--------------|----------------|---------------|
| FMD | Picornaviridae | Aphtovirus |
| VS | Rhabdovirus | Vesiculovirus |
| SVD | Picornaviridae | Enterovirus |
| VES | Caliciviridae | Calicivirus |



Vesicular Diseases : Host Range



| | FMD | VS | SVD | VES |
|----------|------|------|-------|--------|
| CATTLE | Yes | Yes | No | No |
| PIGS | Yes | Yes | Yes | Yes |
| HORSES | No | Yes | No | No |
| HUMANS | No | Some | Could | No |
| WILDLIFE | Many | ??? | Swine | Marine |



Clinical Susceptibility



| | FMD | VSV | SVD | VES |
|----------|------|------|-------|--------|
| Cattle | Yes | Yes | No | No |
| Pigs | Yes | Yes | Yes | Yes |
| Sheep | Yes | No ? | No | No |
| Horses | No | Yes | No | No |
| Humans | No | Some | Could | No |
| Wildlife | Many | ??? | Swine | Marine |





Foot-and-Mouth Disease

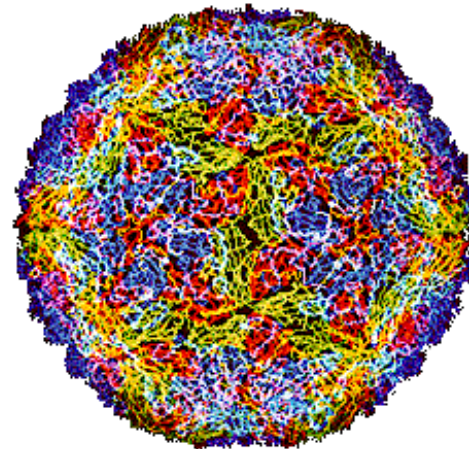
- Foot-and-mouth disease (FMD) is an extremely contagious, viral disease of domestic cloven-hoofed and many wild animals, characterized by fever, vesicular lesions and, subsequent erosions of the epithelium of the mouth, tongue, nares, muzzle, feet, and teats.





FMD Virus Serotypes

- 7 Types (with > 60 Subtypes)
 - A (A₅, A₂₄, etc)
 - O (O₁, etc)
 - C (C₃, etc)
 - SAT-1
 - SAT-2
 - SAT-3
 - Asia-1



FMD Virus Stability



- pH Sensitive: <6.5 or >11.0
- UV Sensitive: (sun light)
- Survives in moist, organic-rich materials





FMD Transmission

- Aerosols
- Direct contact
- Meat products
- Fomites





FMD - Epidemiology

- Portal of entry:
 - Respiratory tract
 - Oral (swine)
- Incubation: 1 - 5 days
- Clinical duration: 3 - 4 weeks





FMD - Epidemiology

- Morbidity: >95%
- Mortality: <1% Adults
>50% Neonates
- Carrier state: in cattle (6-24 months)



FMD Epidemiology



- Horses:
 - Not susceptible
 - Not carriers
- Humans:
 - Not susceptible
 - Short term survival in throat
 - After 24-30hrs of high aerosol inhalation
 - Plum Island experience – no transmission by laboratory workers in daily contact with FMD animals





FMD - Clinical Signs

- Fever
- Lameness
- Blanching of coronary bands
- Salivation
- Vesicles and erosions
 - Tongue, lips, snout/muzzle, coronary bands, interdigital cleft, soles, teats, & rumen pillars.



FMD- Cattle Salivation

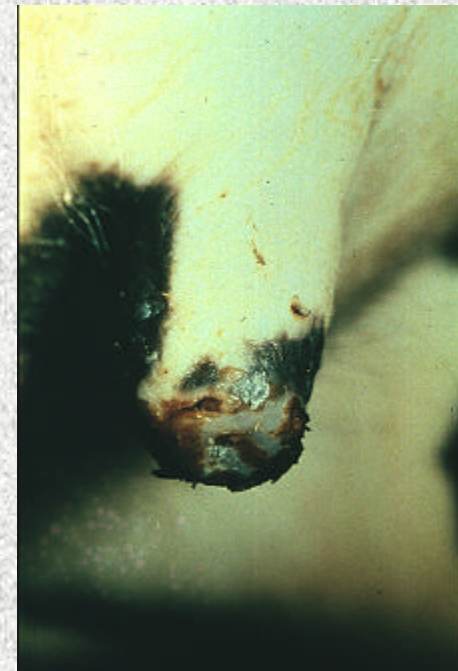
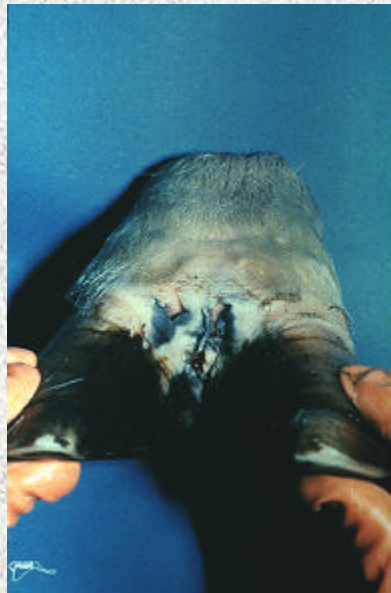
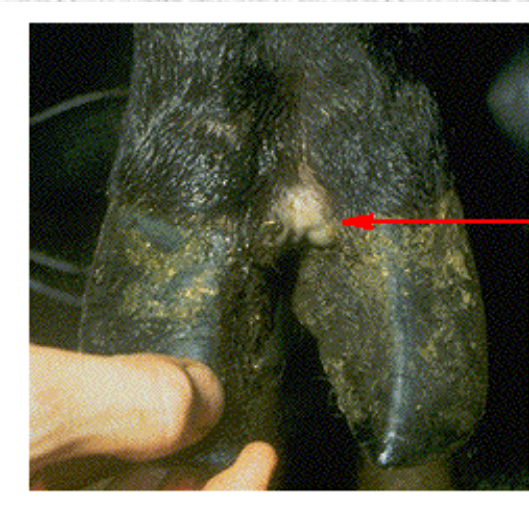


FMD- Cattle Tongue Lesions



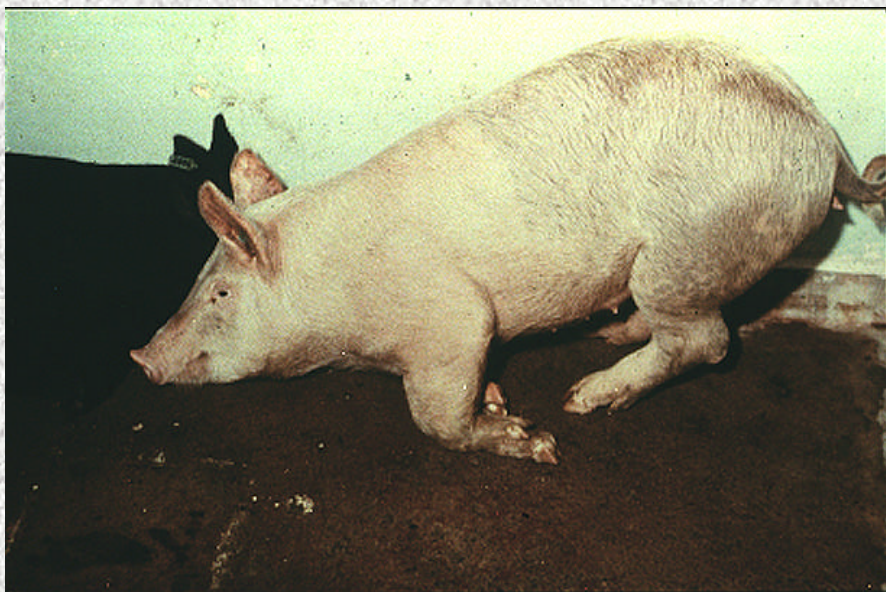
FMD – Cattle

Feet & Teat Lesions



FMD – Swine

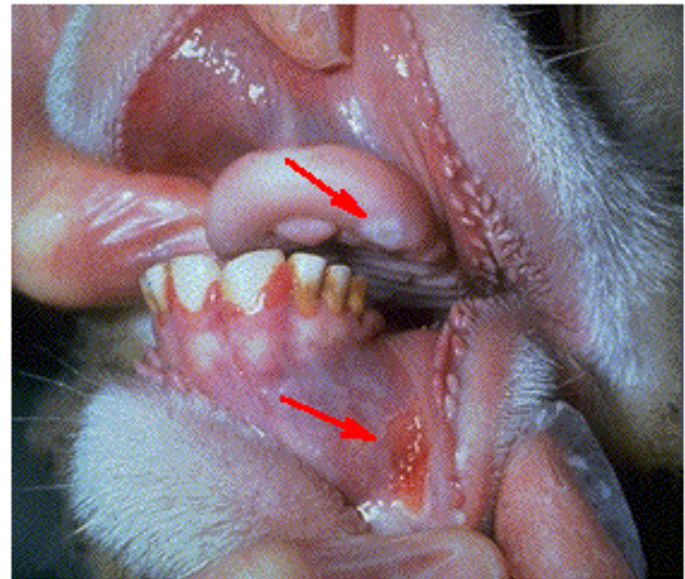
Feet & Snout Lesions



FMD – Swine Feet Lesions



FMD – Ovine Lesions



FMD - Cattle

Differential Diagnosis



- BVD - Mucosal Disease
- Rinderpest
- Bluetongue - Epizootic Hemorrhagic Disease
- Malignant Catarrhal Fever
- IBR
- Foot-rot
- Pseudocow Pox - Papular Stomatitis
- Herpes Mammillitis
- Chemical Burns



Vesicular Diseases :

Diagnostic Samples



- Vesicular Epithelium
- Vesicular Fluid
- Oesophageal-Pharyngeal (OP) Fluids
- Serum (Acute and Convalescent)



Vesicular Diseases :

Diagnostic Tests



■ Antigen detection:

- Virus Isolation (in vitro or in vivo)
- Complement Fixation
- ELISA
- Polymerase Chain Reaction (PCR)

■ Antibody detection:

- FMD: Virus Infection Associated Antigen (VIAA)
- Virus Neutralization
- ELISA
- Western Blot





FMD Natural or Artificial Immunity

- Short duration of immunity
- Type and subtype specific
- Inactivated vaccines available





FMD - Prevention

- Control of importation of animals and products
- Decontamination and disposal of foreign garbage
- Strong animal health infrastructure
- Reportable disease & Prompt diagnosis



FMD

Control and Eradication

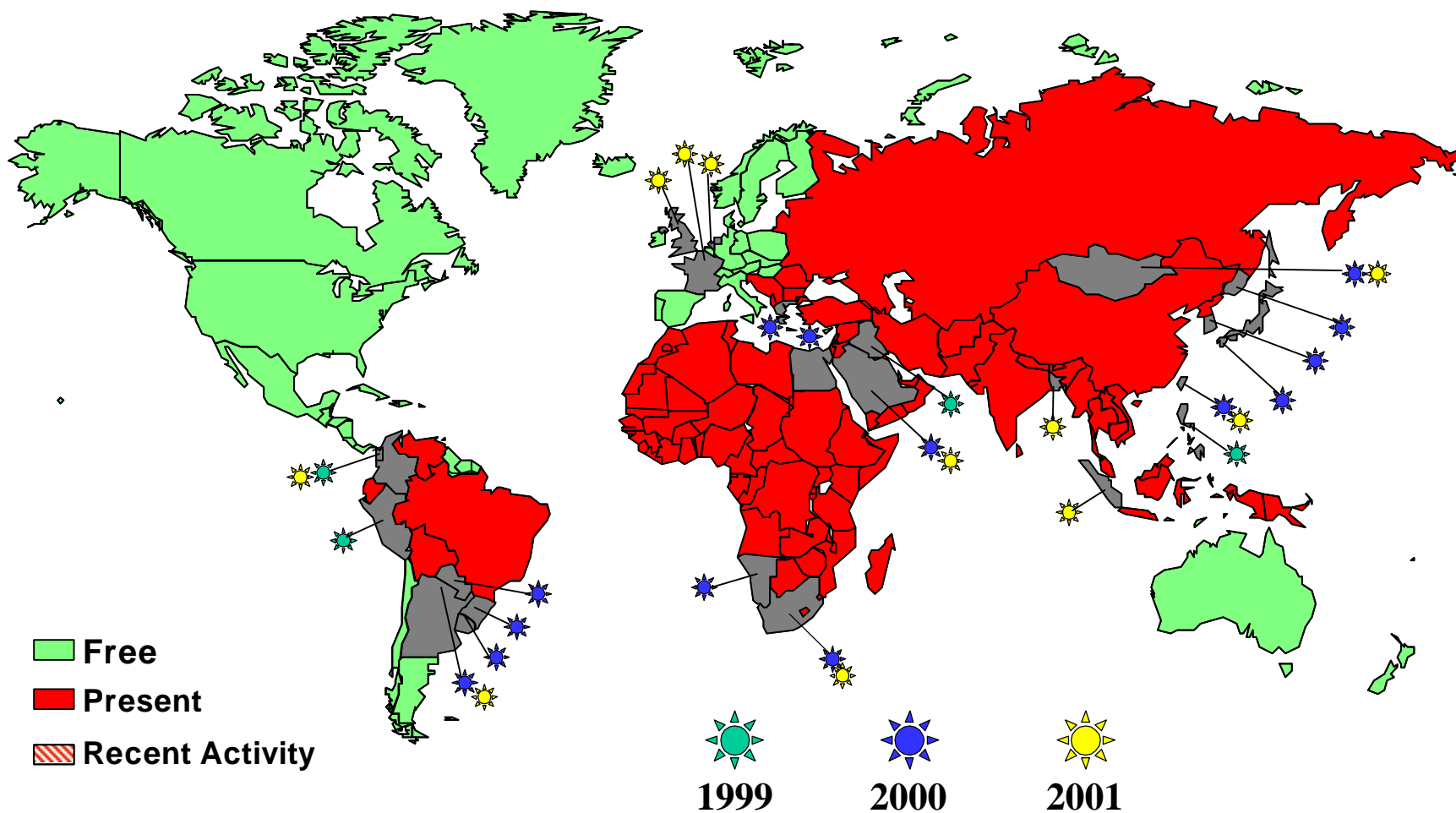


- Quarantine, stop movement of animals and products
- Disinfection of vehicles and personnel
- Slaughter of infected and contact animals
- Destruction of infected carcasses
- Ring / Strategic vaccination



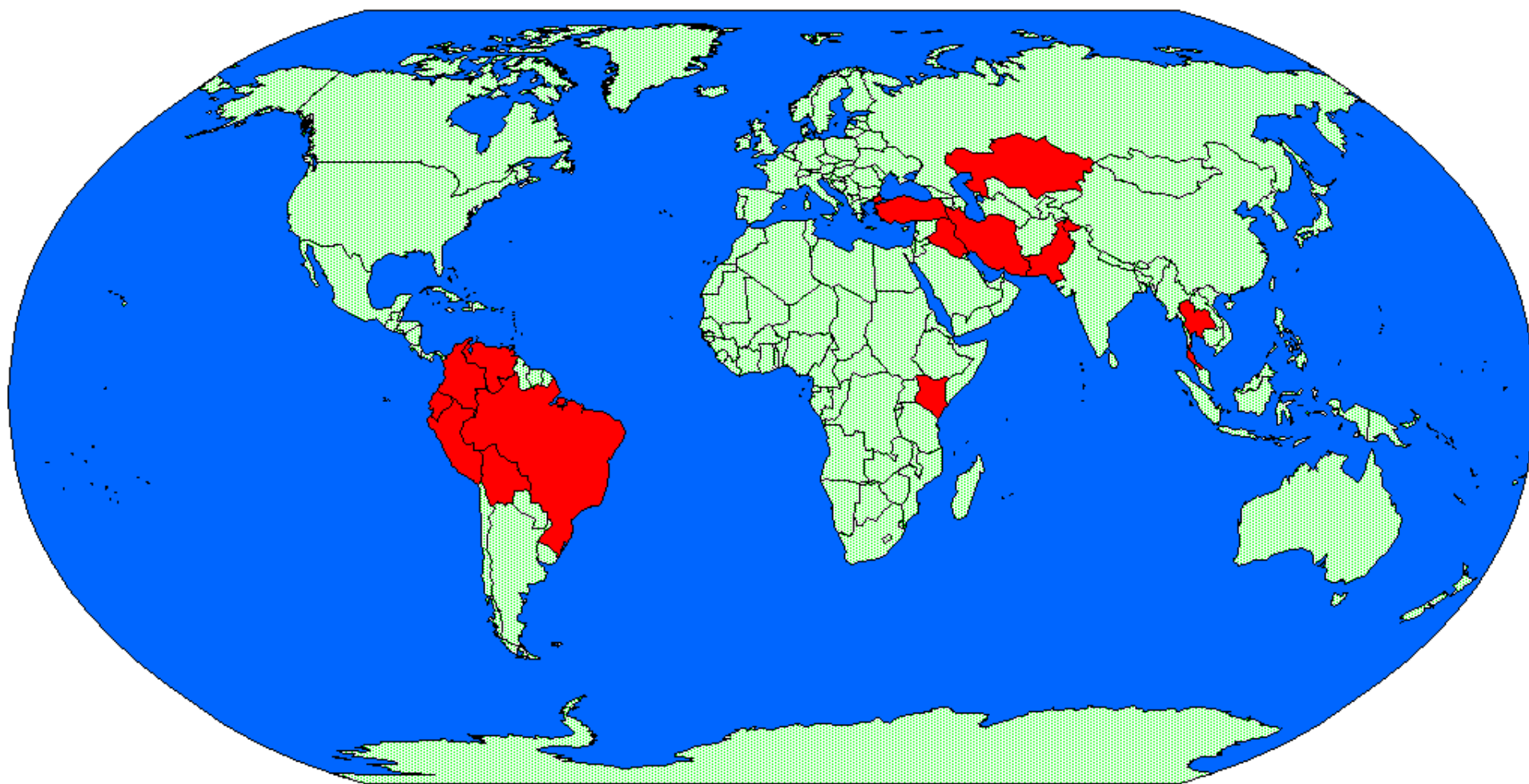
Foot-and-Mouth Disease

Distribution and Recent Activity



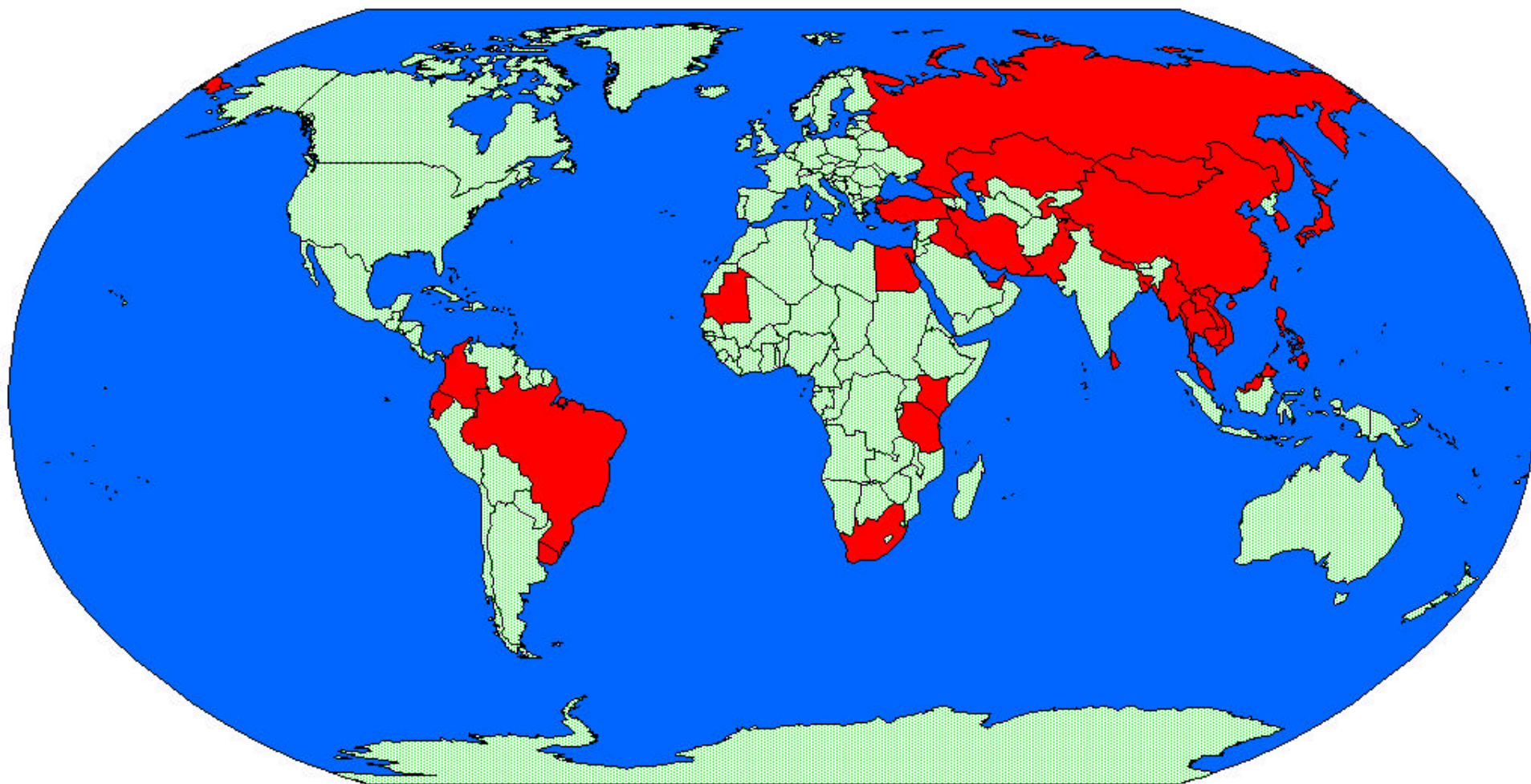
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FMD Type A outbreaks 2000



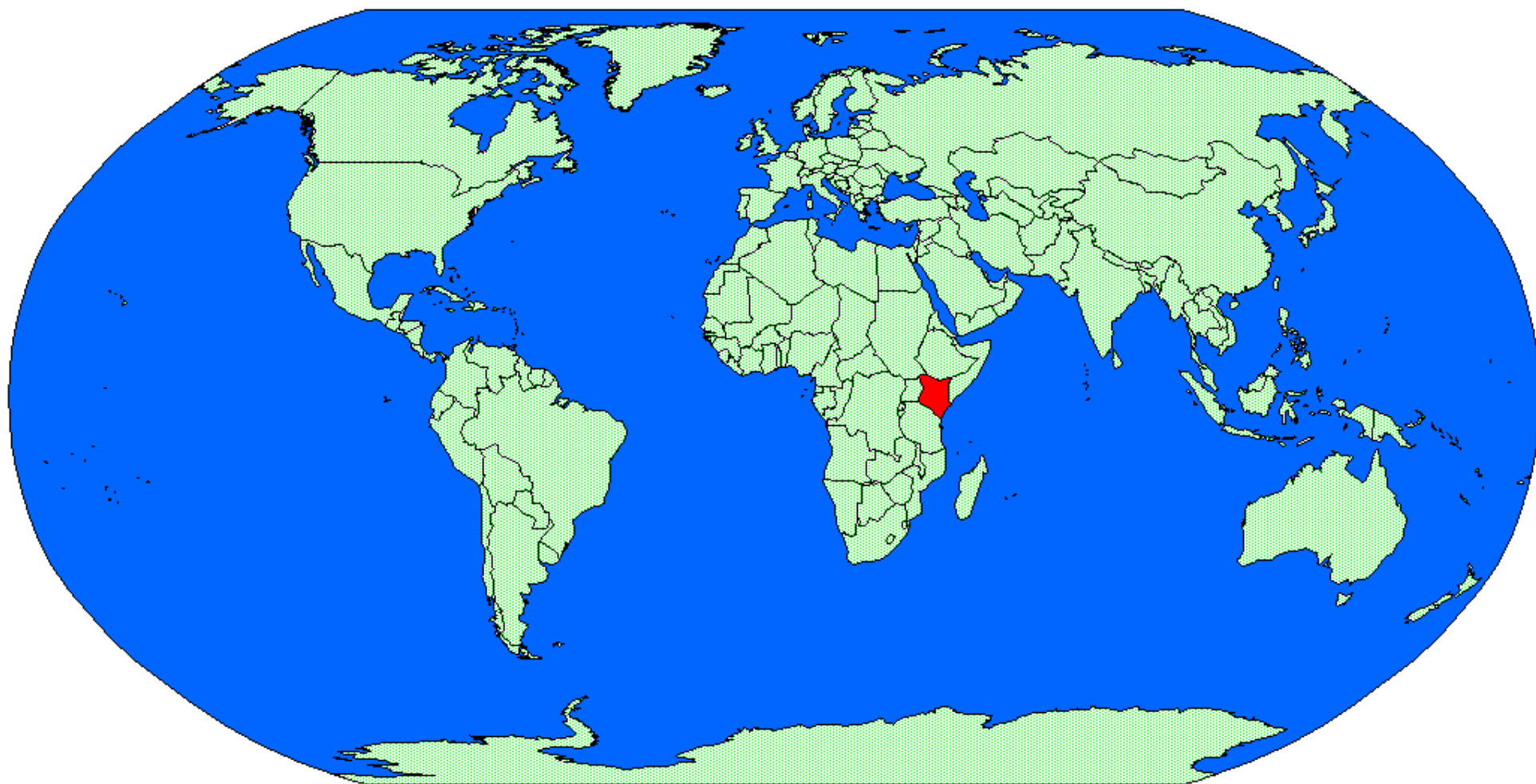
FMD Type A as officially reported to OIE,WRL,FAO

FMD Type O outbreaks 2000



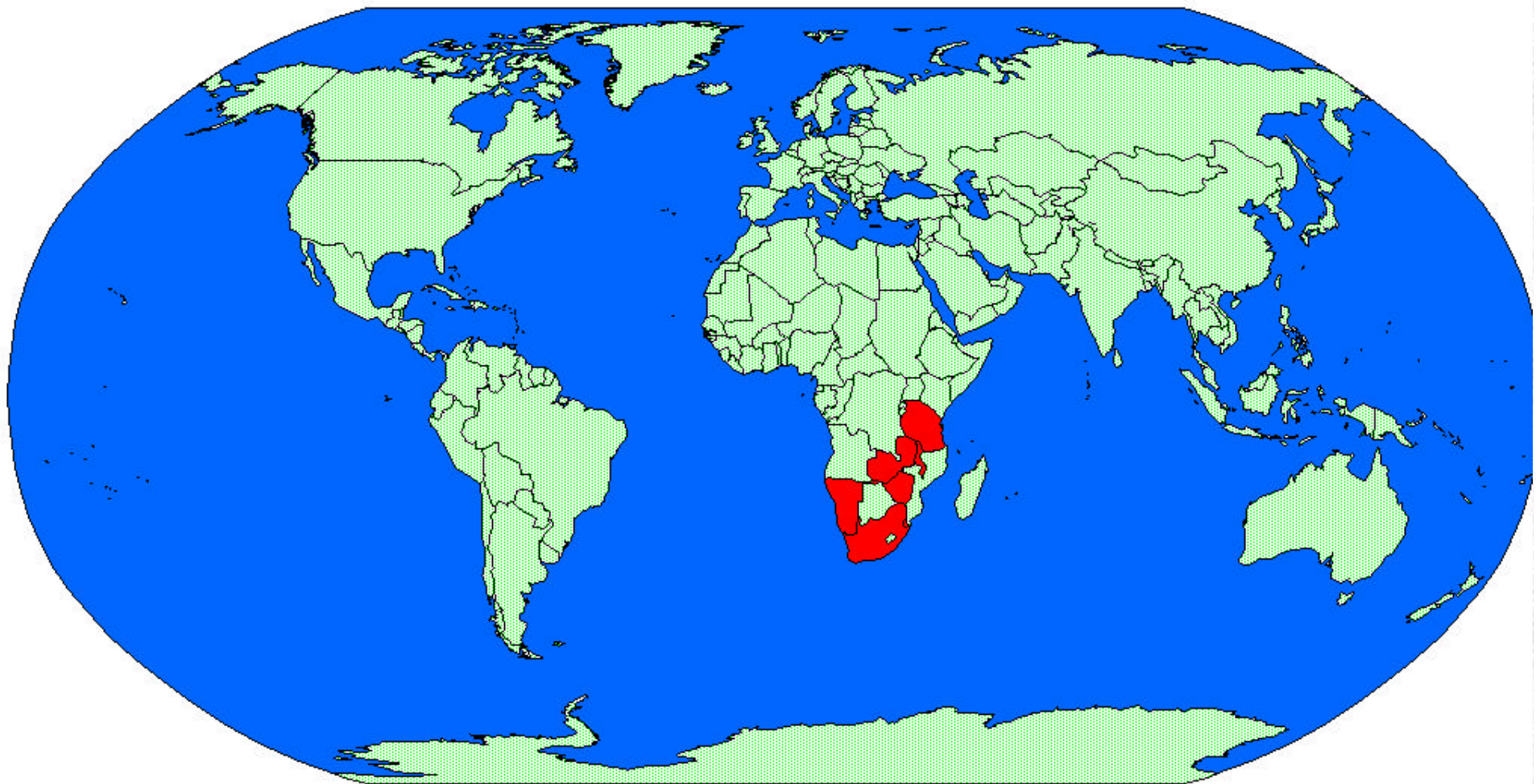
FMD Type O as officially reported to OIE,WRL,FAO

FMD Type C outbreaks 2000



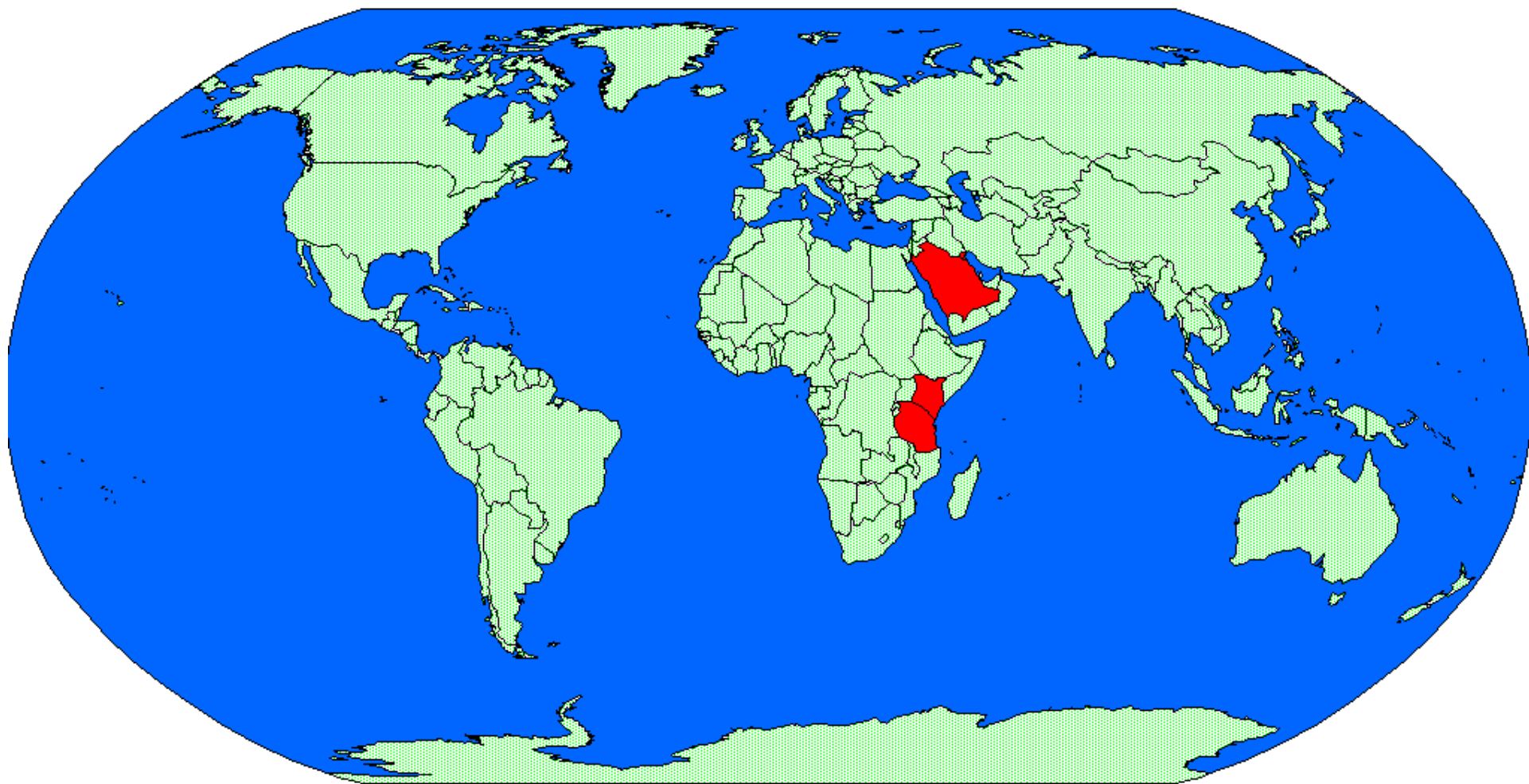
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FMD Type SAT1 outbreaks 2000



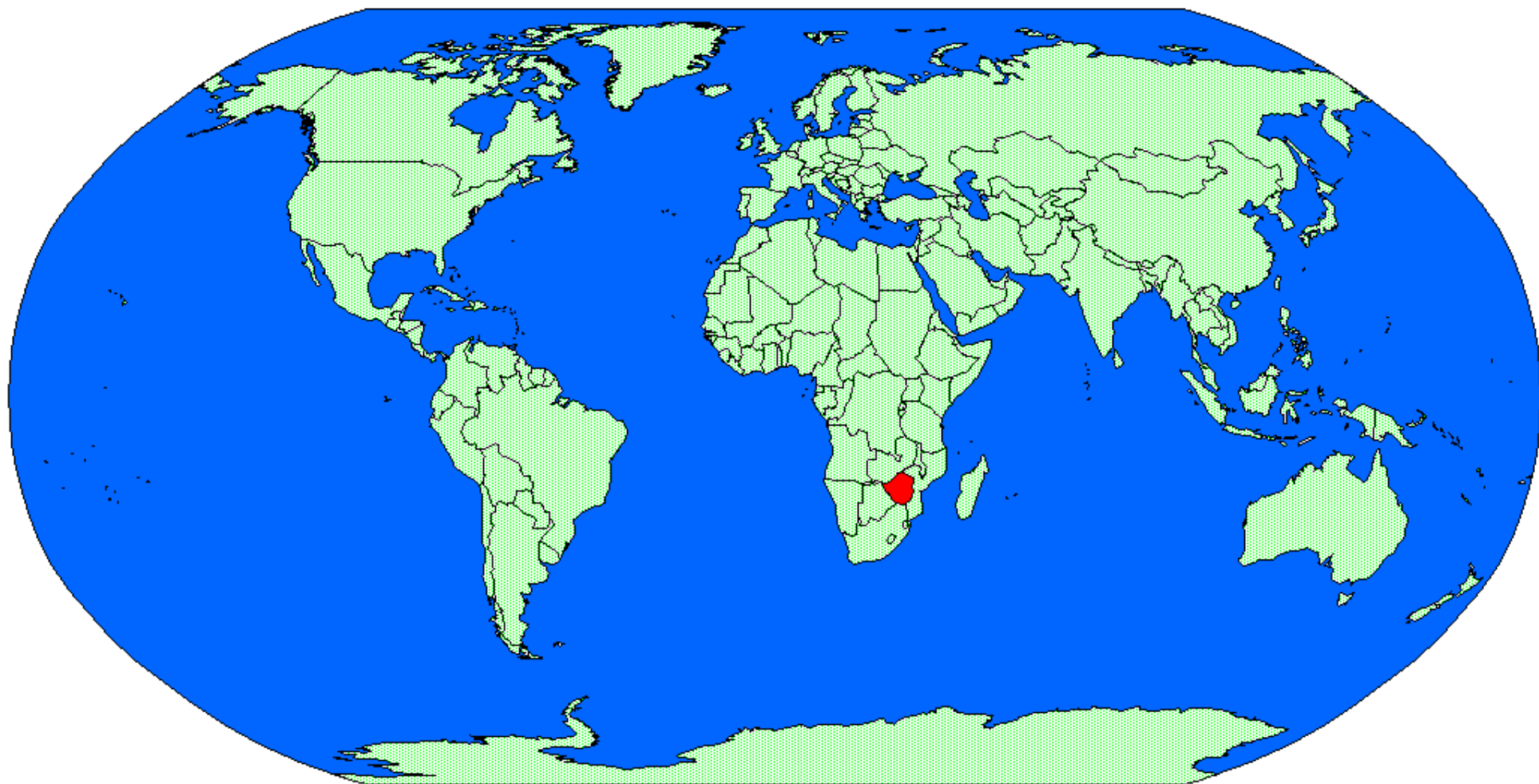
FMD Type SAT 1 as officially reported to OIE,WRL,FAO

FMD Type SAT2 outbreaks 2000



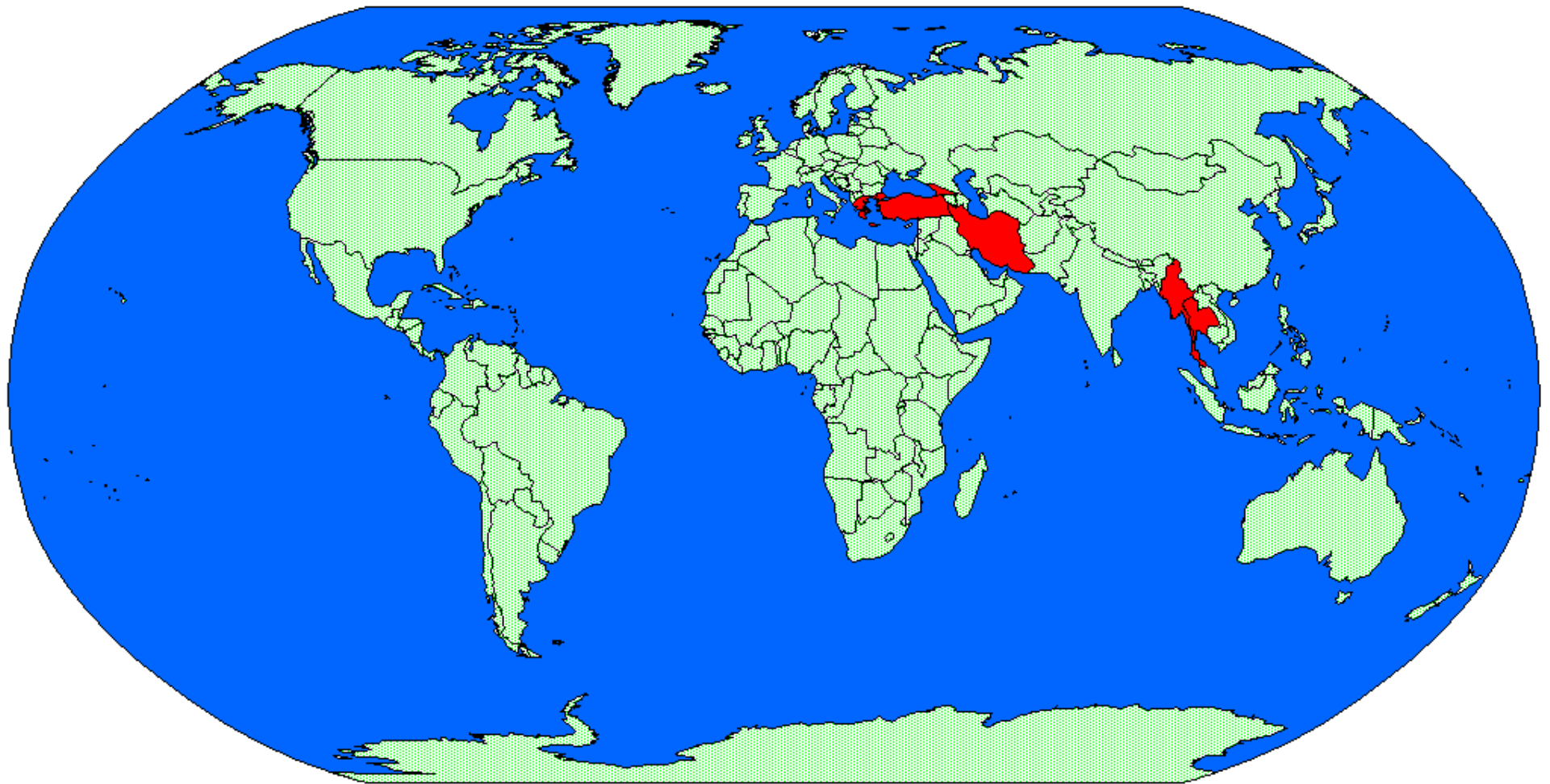
FMD Type SAT 2 as officially reported to OIE,WRL,FAO

FMD Type SAT3 outbreaks 2000



FMD Type SAT3 as officially reported to OIE, WRL, FAO

FMD Type Asia 1 outbreaks 2000



FMD Type Asia 1 as officially reported to OIE,WRL,FAO

